



(43) International Publication Date  
2 December 2004 (02.12.2004)

PCT

(10) International Publication Number  
**WO 2004/104899 A3**

(51) International Patent Classification<sup>7</sup>: **H04L 9/32**

(21) International Application Number:  
PCT/IB2004/050689

(22) International Filing Date: 13 May 2004 (13.05.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
03101453.3 21 May 2003 (21.05.2003) EP

(71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **TUYLS, Pim, T.** [BE/BE]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **DENTENEER, Theodorus, J., J.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **LINNARTZ, Johan, P., M., G.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **VERBITSKIY,**

**Evgeny, A.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

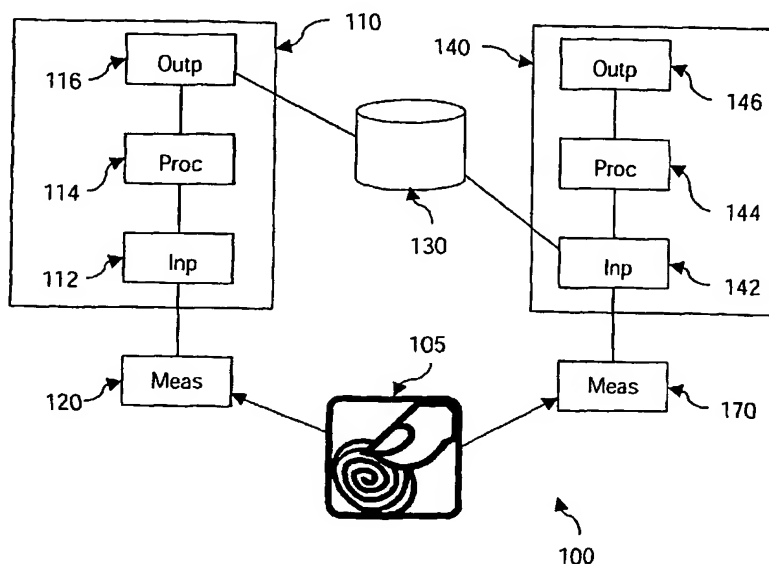
(74) Agent: **GROENENDAAL, Antonius, W., M.**; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR AUTHENTICATION OF A PHYSICAL OBJECT



(57) Abstract: A system for authenticating a physical object includes an enrolment device, an authentication device, and a storage for storing authentication data. The enrolment device includes an input for receiving a property set *Y* of the object measured using a measurement procedure. A processor is used for creating a property set *I* from the measured property set *Y* that meet a predetermined robustness criterion. It then creating a property set *A* from the property set *I* that includes less information on the actual properties than property set *Y*, and finally generates a control value *V* in dependence on properties of the property set *A*. An output is used for supplying the control value to the storage as part of the authentication data. The enrolment device operates in an analogous way.

**Declaration under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

**Published:**

- with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:  
27 January 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04L9/32

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H04L G06F G07C G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)  
EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 291 560 A (DAUGMAN JOHN G) 1 March 1994 (1994-03-01) figure 1 column 4, line 53 - line 68	1-18
A	US 2002/029341 A1 (FRYKHOLM NIKAS ET AL) 7 March 2002 (2002-03-07) abstract	1-18
A	WO 98/12670 A (BORZA STEPHEN J ; FREEDMAN GORDON (CA); DEW ENGINEERING AND DEV LIMITE) 26 March 1998 (1998-03-26) figure 8	1-18
A	MENEZES, VANSTONE, OORSCHOT: "Handbook of Applied Cryptography" 1997, CRC PRESS LLC, USA, XP002298499 page 387 - page 390	1-18

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

29 September 2004

Date of mailing of the international search report

10/12/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

San Millán Maeso, J

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5291560	A	01-03-1994	CA	2145659 A1	28-04-1994
			WO	9409446 A1	28-04-1994
			AU	2808092 A	09-05-1994
			EP	0664037 A1	26-07-1995
			JP	3307936 B2	29-07-2002
			JP	8504979 T	28-05-1996
			AT	211279 T	15-01-2002
			DE	69232314 D1	31-01-2002
			DE	69232314 T2	20-06-2002
			DK	664037 T3	11-03-2002
			HK	1013156 A1	31-05-2002
US 2002029341	A1	07-03-2002	AT	255787 T	15-12-2003
			AU	3228600 A	14-09-2000
			CA	2362882 A1	31-08-2000
			DE	60006935 D1	15-01-2004
			EP	1149475 A1	31-10-2001
			JP	2002538504 A	12-11-2002
			AU	5120201 A	23-10-2001
			WO	0177792 A2	18-10-2001
			WO	0051244 A1	31-08-2000
WO 9812670	A	26-03-1998	AU	4196497 A	14-04-1998
			CA	2233942 A1	26-03-1998
			WO	9812670 A1	26-03-1998